

REMARKS

I. Claims 1, 4-6, 9, 17-23, and 27-29: 35 USC §102

a. Claims 1, 4-6, 9, and 17-22

Claims 1, 4-6, 9 and 17-22 are directed to a handsfree system for use in a vehicle. The system comprises a microphone with at least two microphones and a signal processing means where the signal processing means comprises a regularized superdirective beamformer with fixed superdirective filters. The regularized superdirective beamformer is configured to use a finite regularized parameter μ that is frequency dependent.

U.S. Patent No. 7,076,072 to Feng et al. (“*Feng*”) discloses systems and methods for interference-suppression with directional sensing patterns. In *Feng*, the system processes inputs from an acoustic sensor array to extract a desired acoustic signal through the suppression of interfering signals. *See abstract*. The suppression is performed by modifying the array inputs in the frequency domain with weights selected to minimize variance of the resulting output signal while maintaining unity gain of signals received in the direction of the desired acoustic signal. *Id.*

Feng, however, does not disclose a regularized superdirective beamformer with fixed superdirective filters where the superdirective beamformer is configured to use a finite regularized parameter that is frequency dependent. While *Feng* discloses the use of a beamformer, *see col. 17, lines 1-5*, *Feng* does not disclose the use of a “superdirective” beamformer. Moreover, since *Feng* does not disclose a “superdirective” beamformer, it also does not disclose a regularized superdirective beamformer using a finite regularization parameter that is frequency dependent.

The Applicant respectfully asserts that for at least these reasons *Feng* does not disclose all of the features of claims 1, 4-6, 9, and 17-22. Therefore, the Applicant respectfully requests the withdrawal of these rejections.

With respect to claim 5, the Applicant respectfully asserts that *Feng* does not disclose a superdirective filter that comprises a filter in the time domain. *Feng* operates in the frequency domain and not the time domain. *See abstract* (“The extraction/suppression is performed by modifying the array (20) inputs in the frequency domain. . .”) (*emphasis added*). Additionally the section of *Feng* that the Office Action cites to in the rejection of

claim 5, col. 8, lines 25-30, discloses that the designed filter is designed and applied in the spectral domain and not the time domain. (“In stage 150, multiplier weights $W_A^*(k)$, $W_B^*(k)$ are applied to $X_A(k)$ and $X_B(k)$, respectively in accordance with the relationship (1) for each frequency k to provide the output spectra $Y(k)$.”). Therefore, the Applicant respectfully asserts that *Feng* does not disclose the feature of claim 5.

b. Claims 23 and 27-29

Claims 23, and 27-29 are directed to a handsfree system for use in a vehicle. The system comprises a microphone array with at least two microphones and a superdirective beamformer having fixed superdirective filters. In this system, the superdirective beamformers are configured with a predetermined susceptibility that is based on a relative error of the microphone array.

As explained above, *Feng* does not disclose a superdirective beamformer. Moreover, *Feng* does not disclose a superdirective beamformer configured with a predetermined susceptibility that is based on a relative error of the microphone array. The term “susceptibility” does not appear in *Feng*, and the angle at which a sound can impinge of the array of *Feng* with respective to the axis AZ does not disclose configuring a superdirective beamformer with a predetermined susceptibility that is based on a relative error of the microphone array.

Accordingly, the Applicant respectfully asserts that *Feng* does not disclose all of the features of claims 23 and 27-29. Therefore, the Applicant respectfully requests the withdrawal of these rejections.

II. Claim 7: 35 USC §103

Claim 7 depends from claim 1 and includes all of the features of this claim. Claim is directed to a handsfree system for use in a vehicle. The system comprises a microphone with at least two microphones and a signal processing means where the signal processing means comprises a regularized superdirective beamformer with fixed superdirective filters. The regularized superdirective beamformer is configured to use a finite regularized parameter μ that is frequency dependent.

The proposed combination of *Feng* and U.S. Patent No. 5,659,619 to Abel (“*Abel*”) discloses systems and methods for interference-suppression with directional sensing patterns employing complexity imaging filters for three-dimensional virtual audio display. *Abel* fails to fill the gaps of the *Feng* disclosure with respect to the claimed regularized superdirective

beamformer and the use of a finite regularization parameter that is frequency dependent by the regularized superdirective beamformer, as explained in section I(a).

Accordingly, the Applicant respectfully asserts that the proposed combination of *Feng* and *Abel* does not disclose all of the features of claim 7. Therefore, the Applicant respectfully requests the withdrawal of this rejection.

III. Claim 8: 35 USC §103

Claim 8 depends from claim 1 and includes all of the features of this claim. Claim 8 is directed to a handsfree system for use in a vehicle. The system comprises a microphone with at least two microphones and a signal processing means where the signal processing means comprises a regularized superdirective beamformer with fixed superdirective filters. The regularized superdirective beamformer is configured to use a finite regularized parameter μ that is frequency dependent.

The proposed combination of *Feng* and U.S. Patent No. 7,158,643 to Lavoie et al. (“*Lavoie*”) is discloses systems and methods for interference-suppression with directional sensing patterns and an auto-calibrating surround system. *Lavoie* fails to fill the gaps of the *Feng* disclosure with respect to the claimed regularized superdirective beamformer and the use of a finite regularization parameter that is frequency dependent by the regularized superdirective beamformer, as explained in section I(a).

Accordingly, the Applicant respectfully asserts that the proposed combination of *Feng* and *Lavoie* does not disclose all of the features of claim 8. Therefore, the Applicant respectfully requests the withdrawal of this rejection.

IV. Claims 12-14 and 25-26: 35 USC §103

Claims 12-14 and 25-26 depend from claims 1 and 23, respectively and therefore are directed to a handsfree system for use in a vehicle. The systems of these claims comprise a superdirective beamformer. In claims 12-14 the superdirective beamformer is a regularized superdirective beamformer using a finite regularization parameter that is frequency dependent. In claims 25-26 the superdirective beamformer is configured with a predetermined susceptibility that is based on a relative error of the microphone array.

The proposed combination of *Feng* and U.S. Patent Application Publication No. 2003/0063759 to Brennan et al. (“*Brennan*”) discloses systems and methods for interference-suppression with directional sensing patterns and directional audio signal processing using an oversampled filterbank. *Brennan* fails to fill the gaps of the *Feng* disclosure with respect to

the claimed regularized superdirective beamformer and the use of a finite regularization parameter that is frequency dependent by the regularized superdirective beamformer, as explained in section I(a).

Accordingly, the Applicant respectfully asserts that the proposed combination of *Feng* and *Brennan* does not disclose all of the features of claims 12-14 and 25-26. Therefore, the Applicant respectfully requests the withdrawal of these rejections.

V. Claims 15-16: 35 USC § 103

Claims 15-16 depend from claim 1 and includes all of its features. Claims 15-16 are directed to a handsfree system for use in a vehicle. The system comprises a microphone with at least two microphones and a signal processing means where the signal processing means comprises a regularized superdirective beamformer with fixed superdirective filters. The regularized superdirective beamformer is configured to use a finite regularized parameter μ that is frequency dependent.

The proposed combination of *Feng* and U.S. Patent No. 4,696,043 to Iwahara et al. (“*Iwahara*”) discloses systems and methods for interference-suppression with directional sensing patterns and a microphone apparatus having a variable directivity pattern. *Brennan* fails to fill the gaps of the *Feng* disclosure with respect to the claimed regularized superdirective beamformer and the use of a finite regularization parameter that is frequency dependent by the regularized superdirective beamformer, as explained in section I(a).

Accordingly, the Applicant respectfully asserts that the proposed combination of *Feng* and *Iwahara* does not disclose all of the features of claims 15-16. Therefore, the Applicant respectfully requests the withdrawal of these rejections.

VI. Claim 10: 35 U.S.C. §103

Claim 10 depends from claim 1 and includes all of its features. Claim 10 is directed to a handsfree system for use in a vehicle. The system comprises a microphone with at least two microphones and a signal processing means where the signal processing means comprises a regularized superdirective beamformer with fixed superdirective filters. The regularized superdirective beamformer is configured to use a finite regularized parameter μ that is frequency dependent.

The proposed combination of *Feng* and U.S. Patent No. 6,339,758 to Kanazawa et al. (“*Kanazawa*”) discloses systems and methods for interference-suppression with directional sensing patterns and a noise suppress processing apparatus and method. *Kanazawa* fails to

fill the gaps of the *Feng* disclosure with respect to the claimed regularized superdirective beamformer and the use of a finite regularization parameter that is frequency dependent by the regularized superdirective beamformer, as explained in section I(a).

Accordingly, the Applicant respectfully asserts that the proposed combination of *Feng* and *Kanazawa* does not disclose all of the features of claim 10. Therefore, the Applicant respectfully requests the withdrawal of this rejection.

VII. Claims 11 and 24: 35 U.S.C. §103

Claims 11 and 24 depend from claims 1 and 23, respectively. The systems of these claims comprise a superdirective beamformer. In claim 11 the superdirective beamformer is a regularized superdirective beamformer using a finite regularization parameter that is frequency dependent. In claim 24 the superdirective beamformer is configured with a predetermined susceptibility that is based on a relative error of the microphone array.

Feng discloses systems and methods for interference-suppression with directional sensing patterns. As explained above in section I(a), *Feng* does not disclose all of the limitations of claims 1 and 23. The Official Notice that is taken with respect to claims 11 and 24 does not address the deficiencies of features that are missing from base claim 1 and 23. Accordingly, the Applicant respectfully asserts that all of the features of claims 11 and 24 are not disclosed by *Feng* in view of the Office Notice. Therefore, the Applicant respectfully requests the withdrawal of these rejections.

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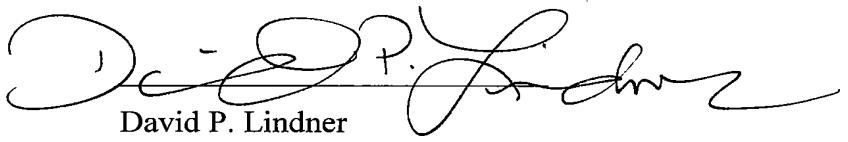
Application No.: 10/563,072

Our Case No.: 11336/1238 (P03036US)

CONCLUSION

In view of the foregoing remarks, the Applicant respectfully submits that pending claims 1 and 4-29 are in condition for allowance, and respectfully requests a Notice of Allowance indicating the same. The Examiner is invited to contact the attorney below if it will assist with the examination of this application.

Respectfully submitted,



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